> **Driving question: Can students save a country from upcoming water shortages?**
>
> **GOOGLE CLASSROOM CODE: u2rhjsn**

Water covers 70% of our planet. However, freshwater—the stuff we use daily—is incredibly rare. Only 3% of the world's total water is fresh, and 66% of that is tucked away in frozen glaciers or otherwise unavailable for ready use.

Climate change and a growing global population greatly contribute to the water scarcity crisis. 1.1 billion people worldwide lack access to water, and 2.7 billion find water scarce for at least one month of the year. In 2018, Cape Town was days away from running out of water. Bangalore is expected to run out of ground water this year. Inadequate sanitation is also a problem for 2.4 billion people.

TASK
In groups of 4-5, students are to choose a digital medium (such as: Google Slides, Prezi, Canva, Brochure, Booklet, Newspaper, Website or other) to create an informative and interesting online resource that incorporates both written and visual elements to present their research, data, graphs and solutions for water scarcity in a country of choice.

The online resource should include multiple sections covering the following:
- **Research** on water scarcity in a country of your choice
- **Identify** the extent and location of water scarcity in the country you chose (include maps)
- **Describe** the cause and effect of water scarcity in your chosen country
- **Propose** a possible action to improve water management in your chosen country
- **Tally/graph** individual family data AND the group data (include/upload the mathematical bookers)
- **Present** information regarding their family's water use and compare it to the water use of a family in their chosen country
- **Set goals** to reduce any unnecessary use of water in the home
- **Bibliography** of resources used

FINAL PRODUCT:
An ONLINE DIGITAL RESOURCE (Google Slides, Prezi, Canva, Brochure, Booklet, Newspaper, Website etc) created by the whole team. This online digital resource must include the individual components (see below) for all group members.

Team components:
- Digital Resource (Google Slides, Prezi, Canva, Brochure, Booklet, Newspaper, Website etc)
- Team Action to improve water management in chosen country
- Collective data represented through a variety of graphs (as per mathematics attachment)
- Bibliography of resources used

Individual components (included in the digital resource and clearly labelled)
- Data that shows monitoring of family water use in the provided tables (see mathematics attachment)
- Construction of hand drawn graphs based on the collected data

● Setting goals to reduce unnecessary use of water at home

FURTHER TASK GUIDANCE

Supporting Questions:
- What is water scarcity?
- What are the causes of water scarcity?
- How widespread is water scarcity in your chosen country?
- Who is impacted most by water scarcity and how?
- How do natural and human processes influence the distribution and availability of water as a resource?
- What effect does the uneven distribution of water resources have on people, places and environments?
- How do we, as individuals, use water?
- How can we track our water usage?
- What is the best way to represent data on water usage?
- What are some strategies to reduce excessive water usage at home?
- What approaches can be used to sustainably manage water resources and reduce water scarcity on a national level?

Steps to completion

1. Brainstorm your need to know questions

Create a list of the questions that you need to know in order to complete the task

2. Research water scarcity
- Identify the extent and distribution of water scarcity in your chosen country.
- Examine how water availability is changing and why (cause of water scarcity)
- Examine how water scarcity impacts people in your chosen country (effect of water scarcity).
- (Include a variety of maps and data to support your evidence)

3. Propose a National Strategy (Team Action)
- As a group, students must research a variety of ways that water scarcity is being tackled on local and national levels around the world.
- Students will develop a Team Action to improve water management in their chosen country

4. Collect individual data
- Each group member will collect data on their own family's water use for **ONE WEEK**. This will be done by completing the table attached at the end of the document.
  - Data includes: washing hands, showering, brushing teeth, flushing the toilet. cooking, washing dishes and clothes etc

5. Data analysis and graph construction
- Using a bar graph and pie chart, students will graph by hand their individual family data
- Using a scatter graph, students graph by hand the collective team data.
- Use a stem and leaf diagram to compare water use between males and females
- Remember that these graphs must be included in your digital resource

6. Goal Setting
- After measuring and graphing their families' current water usage, each student will set TWO goals for reducing water use at their home
- Each student will Identify **TWO** specific strategies to help their families achieve these goals
  - e.g. We will reduce our use of water by one-quarter through taking shorter showers and making sure the dishwasher is full before running it

7. Showcase
- Students will create an online digital resource to showcase their research on water scarcity, proposed national strategy/team action, individual data, collective data, graph construction and goals.

SUBMISSION

One student in each group must submit their product in the PBL Google Classroom <mark>(Code: **u2rhJsn**)</mark>

This is NOT your normal class Google Classroom. Please join this new PBL classroom to submit your assessment. **You must use your @education.nsw.gov.au account** to join this classroom and create your online digital resource.

LESSON ALLOCATION

Mathematics:
- 80 minutes to refresh content previously taught in class. This will be spread over weeks 8-10

HSIE:
- Content related lessons during regular timetabled classes weeks 8-10 to teach water use, water scarcity, access to facilities and services and water management
- 2 Specific Task related lessons

Outcomes:

HSIE- Geography

GE4-1: Students investigate the spatial distribution of global water resources and why water availability varies across countries

GE4-3: Students consider both natural and human-driven causes of water scarcity and must examine the future of water availability in their focus country

GE4-5: Students must, using what they know about water scarcity, devise a strategy for overcoming it in their focus country

GE4-7: Student acquire and process geographical information by selecting and using appropriate and relevant geographical tools for inquiry

GE4-8: Communicated geographical information to a range of audiences using a variety of strategies.

Mathematics

MA4-1WM: Communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols

MA4 -2WM: Applies appropriate mathematical techniques to solve problems

MA4-2WM: Recognises and explains mathematical relationships using reasoning

Marking rubric

Mark	Criteria
18 - 20	● Demonstrates extensive knowledge of water scarcity in the chosen country including extent, location, causes and effects. ● Provides a sophisticated analysis of two or more sustainable water management strategies that the chosen country is using. Includes outline of the role of governments, NGOS, individuals and communities. ● Proposes at least ONE well-informed team action to improve water management in their chosen country ● Comprehensive and accurate collection and comparison of mathematical data ● Detailed, accurate and correct representation of mathematical concepts in a variety of hand drawn graphs ● TWO detailed goals and strategies to reduce family water use are specified by each student ● Communicates geographical information using a variety of visual and written elements and adhering to the general features of their chosen medium. ● Comprehensive bibliography is attached
15-17	● Demonstrates substantial knowledge of water scarcity in the chosen country including extent, location, causes and effects. ● Provides a detailed analysis of two or more sustainable water management strategies that the chosen country is using. Includes reference to the role of governments, NGOs, individuals and communities. ● Proposes at least ONE team action to improve water management in their chosen country ● Detailed and accurate collection and comparison of data ● Detailed, accurate and correct representation of mathematical concepts in a variety of hand drawn graphs ● TWO goals and strategies to reduce family water use are specified by each student ● Communicates geographical information using a variety of visual and written elements and adhering to the general features of their chosen medium. ● Detailed bibliography is attached
10-14	● Demonstrates satisfactory knowledge of water scarcity in the chosen country including extent, location, causes and effects. ● Analyses ONE sustainable water management strategy that the chosen country is using. Includes reference to the role of governments, NGOs, individuals and communities. ● Proposes at least ONE team action to improve water management in their chosen country ● Accurate collection and comparison of data ● Accurate representation of mathematical concepts in a variety of hand drawn graphs ● TWO goals and strategies to reduce family water use are specified ● Communicates geographical information using a variety of visual and written elements and adhering to the general features of their chosen medium. ● Bibliography is included
5-9	● Demonstrates knowledge of water scarcity in the chosen country including extent, location and/or causes and effects. ● Identifies ONE sustainable water management strategy that the chosen country is using. Includes reference to the role of governments, NGOs, individuals and communities. ● Identifies ONE team action to improve water management in their chosen country ● Collection, representation and comparison of data is evident ● Identifies TWO goals and/or strategies to reduce water use ● Bibliography may not be present
0-4	● Demonstrates limited knowledge of water scarcity in the chosen country ● Does not identify a sustainable water management strategy ● Makes limited mention of actions to improve water management ● Collection, representation and comparison of data is missing ● No goals or strategies to reduce water use are included ● No bibliography included